

**Facilitator's Guide
Workshop on the
Detection and Control of Epidemic Cholera**

Data for Decision Making Project
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Facilitator's Guide Workshop on the Detection and Control of Epidemic Cholera

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Facilitator's Guide

Workshop on Detection and Control of Epidemic Cholera

Why is this Course Needed?

Epidemic cholera continues to be a grave problem in Africa. Since the 7th pandemic of cholera arrived in Africa in 1970, the disease has persisted in some areas as a persistent or endemic problem. In addition, large epidemics have claimed many lives.

Because cholera can spread swiftly through a population, early detection of cases is necessary in order to start education and sanitation activities rapidly and to identify possible sources of infection. Training health care workers to recognize and treat cholera patients, maintaining a local reserve of rehydration supplies, and educating the public in ORS use and the need to seek treatment when diarrhea begins will avert many cholera deaths. When an epidemic of cholera does occur, many cases and deaths can be prevented if the epidemic is detected *early*, and if effective control measures are begun *quickly*.

The course is designed to prepare district health personnel to detect epidemics of cholera early and to control epidemics effectively. District health personnel who attend the workshop and who carry out a series of self-study projects will:

- learn about the epidemiology of cholera
- learn how to detect epidemics of cholera
- learn how to control epidemics of cholera
- do projects to prepare the district for a cholera epidemic
- evaluate their district's readiness to respond to an epidemic
- make an emergency response plan.

Who Should be the Participants in the Workshop?

The workshop is designed for district level public health personnel (such as District Health Officers) who have public health responsibility for a population of approximately 250,000 persons. These personnel are in the "front-line" in terms of detecting epidemics of cholera and they often are the most peripheral level at which an effective response can be mounted.

Workshop participants should, in turn, train health workers in their own districts.

Who Should be the Facilitators for the Workshop?

Workshop facilitators should be public health or clinical experts who have had experience in responding to epidemics of cholera and who have experience in teaching. The participants in the workshop are district level personnel, so facilitators will usually be from the provincial, regional or national level. If facilitators and participants are from the same state or region, it will be easier for the facilitators to provide follow-up consultation and supervision. A Course Director will be in charge of most of the administrative arrangements and of overall planning for the workshop.

How should the facilitators be trained?

All potential facilitators should attend the workshop themselves. They should work on the Self-Study Projects or thoroughly discuss them. Then, using the Facilitator’s Guide, they should practice conducting the entire course -- several times, if possible.

Preparation Checklist for the Workshop

Use this checklist to prepare for a workshop. The course director should assign specific responsibilities and be sure that each activity is done on time. There are blank rows at the end for adding more activities.

What to Do	When	Person Responsible	Date Completed
Schedule workshop	___ months before		
Arrange funding for workshop	___ months before		
Arrange accommodations for staff and participants	___ months before		
Select and invite participants	___ months before		
Arrange transportation and other reimbursement	___ weeks before		
Arrange meals, tea/coffee	___ weeks before		
Select and meet with training staff (facilitators, guest lecturers, technical experts)	___ weeks before		
Prepare workshop schedule and assign facilitator responsibilities	___ weeks before		
Make all preparations listed for each lesson (see list on page 7, 12)	___ weeks before		
Arrange for workshop venue	___ weeks before		
Invite sponsors for opening ceremony	___ weeks before		
Practice conducting workshop with facilitators	___ weeks before		
Obtain materials for participants (course materials and paper, pens, folders, name tags, flipchart paper)	___ weeks before		
Obtain materials needed by facilitators (course materials and paper, pens, chalk, overhead projector and screen/sheet)	___ weeks before		

What to Do	When	Person Responsible	Date Completed

Preparations and Materials Needed before the Workshop

Materials

For the entire workshop:

- ___ overhead projector, additional blank transparency sheets and pens
- ___ flipchart and markers, tape and/or stand to hold paper
- ___ chalkboard and chalk
- ___ pens, pencils, pencil sharpener, paper, erasers, ruler
- ___ calculators (optional)
- ___ 1 copy of the *Guidelines* for each participant
- ___ 1 copy of the *Exercise Book* for each participant. The *Exercise Book* contains exercises that will be done during the workshop and ten Self-Study Projects, which are to be done after the workshop
- ___ 1 copy of the *Guidelines*, the *Exercise Book* and the *Facilitator's Guide* for each facilitator
- ___ 1 set of overhead transparencies for the workshop

Preparations for each Session

Session I

- ___ Assemble one set of workshop materials for each participant
- ___ Make one copy of the workshop schedule for each participant
- ___ Make one copy of the pre-test for each participant

Session II

- ___ Practice lecture and put transparencies in order
- ___ Prepare additional transparencies about cholera in your country (optional)

Session III

- ___ Practice the lecture *Detect and Confirm an Epidemic of Cholera*. Put the transparencies in order.
- ___ Obtain the name and address of the person(s) who should be notified of suspected cases and epidemics; try to find several ways of contacting them.
- ___ If there are other people (e.g., counterparts across the border, police, customs agents etc.) who should be notified, get the names and contact addresses for them also.
- ___ Obtain the name and address of the laboratory to which health facilities in the district should send specimens for confirmation of cholera

Session IV

- ___ Assemble materials
- ___ Practice lectures *Field Investigation* and *Calculation of Attack Rates* and put transparencies in order
- ___ Review calculations for the exercises
- ___ Determine the primary and secondary threshold rates for each of the participant's districts

- ___ In Exercise 3, if participants will use the populations of their own districts for calculating the age-specific attack rates, do the calculations before the lesson

Session V

- ___ Practice lectures and put transparencies in order
- ___ Review the information on clinical presentation and management of cholera in Chapter 2, Section 4.5 and Annex 1 of the *Guidelines*.
- ___ Review the national and local experience in cholera control, and make notes to prepare for the discussion in Learning Activity 5.

Session VI

- ___ Get examples of local or national public education materials on cholera.
- ___ As part of the workshop invitation, ask participants to bring any examples of cholera health education materials with them
- ___ Practice the lecture.

Session VII

- ___ Practice lectures and put transparencies in order
- ___ Find out if there are national or local guidelines which assign specific responsibilities for cholera detection and control to district and health facility level health workers. If there are, compare them to those suggested in Annex 6 of the *Guidelines*. If they differ significantly, prepare a handout of those that apply to the participants and to health workers whom they supervise.
- ___ If all participants are from one area, calculate the amount of treatment supplies that would be needed for that area

Session VIII

- ___ Decide on follow-up activities (i.e., future meetings of participants to discuss/work on Self Study Projects, or scheduled visits to participants as follow up)
- ___ Prepare schedule for completion of Self Study Projects and follow-up activities (e.g., within 3-6 months if only working on the cholera preparedness, or within 12 months if participants are working on yellow fever and / or meningitis preparedness as well).
- ___ Review Self-Study Projects
- ___ Make one copy of the post-test (identical to pre-test) for each participant

How to use this Facilitator's Guide

This *Facilitator's Guide* provides a guide to a workshop on the detection and control of epidemic cholera (2-2½ days). This workshop may be given by itself, or may be combined with workshops on the control of epidemic meningococcal disease and yellow fever. There are suggestions for the preparation of the workshop and detailed lesson plans. You, the facilitator, may want to modify some of the lesson plans based on local experience or policy. You may also make modifications based on the knowledge and skills the participants already have.

Each lesson plan specifies:

- 1) the specific objectives for the lesson
- 2) the methods to use
- 3) the materials that are needed
- 4) any preparation that should be done
- 5) a step by step description of *learning activities*.

How to Prepare for the Workshop - Facilitators

The Course Director will assign responsibilities for certain aspects of the course to individual facilitators. Everyone involved in the course should meet at least one week in advance to discuss how the course will be conducted, to practice the lectures and exercises and to be sure that all preparations have been made. All facilitators should:

1. Attend the workshop themselves.
2. Read the *Technical Guidelines on the Detection and Control of Epidemic Cholera*. Try to read them several times - the more familiar facilitators are with the Guidelines the better the workshop will be.
3. Read through this Facilitator's Guide and the Exercise Book. This will give a good idea of how the workshop should be conducted and the responsibilities of a facilitator.
4. Do all the exercises with the other facilitators.
5. Practice all the lectures they will be responsible for several times.
For each lecture there is a set of prepared overhead transparencies. All the transparencies for each lecture are included in this Facilitator's Guide, as part of the lesson in which they will be used. In the Facilitator's Guide, each transparency is printed in reduced size, and there is room for facilitators to write additional commentary. For most of the transparencies, it is enough to read the words printed on the transparency (making some short phrases into complete sentences). For some transparencies, there is suggested commentary. Each transparency is labelled with keywords to indicate the name of the workshop, the name of the the lecture and number of the transparency in that lecture, e.g., for the lecture on the epidemiology of cholera, the third transparency is labelled "*Cholera / Epidemiology / 3*".

As you practice the lectures and do the exercises, try to anticipate what questions the participants might ask you. In most cases, the answers will be in the Guidelines, but if not, ask the Course Director or another technical expert.

6. Pay special attention to the "Preparation" section for each session in the Facilitator's Guide. Be sure than you have prepared everything needed well before the workshop.

7. If there is extra time in the workshop, do some of the "Self-Study Projects" during the workshop.

**Sample Schedule for Workshop
on the Detection and Control of Epidemic Cholera**

Location

Dates - from Month & Day to Month & Day

Day 1: Date

Time	Session
8:00 - 9:00	Opening Ceremony
9:00 - 10:00	Session I Introduction
10:00 - 10:30	Session II Cholera - Epidemiology
10:30 - 10:45	<i>Tea / Coffee</i>
10:45 - 11:45	Session III Detection and Confirmation of an Epidemic of Cholera
11:45 - 12:30	Session IV Field Investigation
12:30 - 2:30	<i>Lunch</i>
2:20 - 3:45	Session IV (continued) Field Investigation - Analysis and Use of Results
3:45 - 4:00	<i>Tea / Coffee</i>
4:00 - 5:30	Session V Responding to an Suspected or Confirmed Cholera Epidemic

Day 2 Date

Time	Session
8:00 - 9:30	Session V (continued)
9:30 - 10:00	Session VI Health Education
10:00 - 10:30	Session VII Being Prepared for an Epidemic of Cholera
10:30 - 10:45	<i>Tea / Coffee</i>
10:45 - 11:45	Session VII (continued)
11:45 - 12:30	Session VIII Planning for Follow-Up and Self Study Projects
12:30 - 2:30	<i>Lunch</i>
2:20 - 3:45	Session VIII (continued) Planning for Follow-Up and Self Study Projects
3:45 - 4:00	<i>Tea / Coffee</i>
4:00 - 5:30	Session VIII (continued) Planning for Follow-Up and Self Study Projects (continued) Closing

Session I Introduction

OBJECTIVES: Explain the goals and objectives of the workshop.
Administer pre-test

METHODS: Presentation, written test

MATERIALS: Course materials and pre-test for each participant

PREPARATION: ___ Assemble one set of workshop materials for each participant
___ Make one copy of the workshop schedule for each participant
___ Make one copy of the pre-test for each participant

LEARNING ACTIVITIES

1 hour

1. Introduction

- a) Explain the goal and objectives of the workshop. Make these points:
 - the goal of the workshop is save lives by preparing you to detect and respond to epidemics of cholera
 - the best way to save lives is to detect epidemics *early* and to respond *quickly*
 - you will learn to use data that you can gather locally to make decisions

- b) Tell participants that, during this workshop and the follow-up projects, they will:
 - review the epidemiology of cholera
 - learn how to detect outbreaks of cholera
 - learn how to control an outbreak of cholera
 - consider how to prepare their own district (or health facility) for a possible cholera epidemic
 - evaluate whether their area is able to detect and control epidemics of cholera
 - make an emergency response plan.

- c) Remind participants that some of them may have experience in detecting and responding to epidemics of cholera, or of other diseases. Sharing their experiences with the other participants will be an important part of learning in this course.

2. Schedule and Administrative Arrangements

- a) Distribute the schedule for the workshop.

- b) briefly explain any special administrative arrangements (lengthy discussion and any individual problems should be dealt later, not during classroom time).

- c) Explain that after this two day workshop, they will return to their places of work, and undertake a series of practical projects. These projects will allow them to put into action the knowledge and skills learned at the workshop, and will help their districts prepare for a possible outbreak of cholera. The projects should be completed in the 3-12 months after the workshop.

3. **Pre-Test**

Administer the pre-test, if it has not yet been given yet. Tell participants that:

- the facilitators will use the results to improve this and future workshops; they can use the results to see how much they learn during the workshop
- they will take the test again after the workshop.

4. **Distribute Course Materials**

- a) Distribute the course materials
- b) Briefly, orient participants to the sections of the *Guidelines on the Detection and Control of Epidemic Cholera*
- c) Tell participants that they will not have to take notes during lectures, because the information in the lectures is already included in the *Guidelines*.
- d) Briefly, orient them to the three sections of the *Exercise Book*:
 - i) Workshop Exercises - will be done during the two day workshop
 - ii) Self Study Projects - will be done after the workshop

Session II. Cholera: the Disease and Epidemiology

- OBJECTIVES:** At the end of the lesson, participants will be able to explain basic epidemiology of cholera
- METHODS:** Presentation
- MATERIALS:** *Guidelines on the Detection and Control of Cholera*, prepared overhead projector transparencies
- PREPARATION:** ___ Practice lecture and put transparencies in order
___ Prepare additional transparencies about cholera in your country (optional)

LEARNING ACTIVITIES

30 minutes:

1. **Introduction**
Explain the topic and the objectives for the lesson.. Explain that the information given this lesson is also found in Chapters 1 and 2 of the *Technical Guidelines*.
2. **Lecture: Epidemiology of Cholera**
Give a lecture on the epidemiology of cholera. Use the prepared overhead projector transparencies (*add others you prepare about cholera in your country*). Reduced versions of the transparencies are on the following pages -- there is room for you to write additional notes about what you want to say in the lecture.

Answer any questions (however, if the answer to a question will be given in a later session, say so, and ask the participant to wait).

3. **Summary**

After the lecture, ask a participant to summarize the key points, or briefly summarize them yourself.

Session III. Detection and Confirmation of an Epidemic of Cholera

OBJECTIVES: At the end of the lesson, participants will be able to:

- explain the steps in detecting and confirming an epidemic of cholera
- give the case definitions for cholera
- explain how and whom to notify of suspected cases

METHODS: Presentation, discussion, written exercises

MATERIALS: Forms used at district and health center level

PREPARATION:

- ___ Assemble materials
- ___ Practice the lecture and put transparencies in order
- ___ Obtain the name and address of the person(s) who should be notified of suspected cases and epidemics; try to find several ways of contacting them.
- ___ If there are other people (e.g., counterparts across the border, police, customs agents etc.) who should be notified, get the names and contact addresses for them also.
- ___ Obtain the name and address of the laboratory to which health facilities in the district should send specimens for confirmation of cholera

LEARNING ACTIVITIES

1 hour

1. **Introduction**
Explain the topic and the objectives. Explain that the information given this lesson is also found in Chapter 3 of the *Guidelines*.
2. **Lecture: Detecting and Confirming Cholera Epidemics**
Give a lecture on detecting and confirming epidemics of cholera, using the prepared overhead projector transparencies.

There are reduced versions of the lecture transparencies on the following pages. There is room for you to write additional information that you want to mention during the lecture.

3. Exercise - Case Definition of Cholera

Ask participants to turn to page 1 in their Exercise Book, and do the Exercise on the case-definition of cholera. Tell them:

- read the questions and answer them briefly, you do not have to write complete sentences
- you may consult the *Guidelines on the Detection and Control of Epidemic Cholera* to find the answers, but do not consult each other.

When they have finished, review the correct responses, and answer any questions. The correct answers, with some additional explanation for discussion, are in *italics* below.

Exercise 1 - Detecting an Epidemic - Case Definitions

1. Clinical Cholera and Case-Definitions:

a) What are the typical signs and symptoms of clinical cholera? (write key words).

- *profuse, watery diarrhea without fever or abdominal cramps.*
- *stool = clear liquid flecked with white mucus (rice water stool)*
- *vomiting and painful leg cramps*

b) What is the surveillance case definition for cholera in an area where cholera is not known to be present?

- *a person 5 years old or older who develops severe dehydration (Plan C) or dies from acute, watery diarrhea.*

c) What is the surveillance case definition for cholera in an area where cholera is endemic, or where there is an outbreak of cholera?

- *a person 5 years old or older who develops acute, watery diarrhea.*

d) What is the definition of a confirmed case of cholera?

- *any person who has *V. cholerae* O1 or O139 isolated from their stool.*

2) Read about these patients in District A and decide whether or not they meet the case definition for cholera. Cholera has not been reported in District A since the 1991 outbreak.

- a) You receive a note from Health Center Alpha. The note states that a two-year-old girl with watery diarrhea and severe dehydration (Plan C) was brought to the Health Center but died while receiving treatment. Does she meet the case-definition for cholera?

Yes _____ No _____

Teaching Point: No, she does not meet the case-definition. Although she died from acute watery diarrhea, she is younger than 5 years of age. Acute watery diarrhea is common in children under the age of five, and there are many causes.

- b) Later that day, you receive a letter from a Health Centre Beta. This note describes an eight-year-old boy who developed severe, watery diarrhea, vomiting, and leg cramps. He had severe dehydration (Plan C). The boy recovered after receiving intravenous fluids and ORS. The boy's parents told the Health Center their son's illness was probably food poisoning caused by eating bad fish.

Does he meet the case-definition for cholera? How would you report this case?

Yes _____ No _____

Immediately report a case of suspected cholera.

Teaching Points:

- *He meets the case-definition because he is eight-years-old and he developed severe dehydration (Plan C) from his acute, watery diarrhea.*
- *Although his parents report his illness as "food poisoning" and do not suspect cholera, the boy meets the surveillance case definition for suspected cholera. His case should be immediately reported as suspected cholera.*
- *Should the Health Center have sent the report of this case by letter?*

- d) The next day, three of the boy's adult family members developed watery diarrhea. His father and 16 year old brother had *some* signs of dehydration (Plan B) and his mother had *no* signs of dehydration (Plan A). All were successfully treated with ORS at the Health Center.

Do the family members meet the case-definition for cholera?

Father Yes _____ No _____

Mother Yes _____ No _____

Brother Yes _____ No _____

Teaching points:

- *The boy's three adult family members who became ill did not meet the surveillance case definition because their dehydration was not severe (Plan C).*
- *However, they would meet the surveillance case definition in an area where cholera is endemic or where a confirmed epidemic is occurring. Cholera has not been recognized in District A since 1991.*

e) Should the District Health Officer visit either of the two health centers to investigate whether a cholera outbreak is occurring? If so, which health center?

He should visit Beta Health Centre.

Teaching point: The District Health Officer should visit the health center where the eight-year-old boy was treated. In an area where cholera is not endemic, a community investigation should be conducted when even one person meets the surveillance case definition for suspected cholera.

f) One week later, it is clear that there is a cholera epidemic in the area. Cholera has been confirmed by the laboratory. Three patients come to the hospital with acute watery diarrhea.

- Patient A is 40 years old and has no signs of dehydration,
- Patient B is 18 years old and has some signs of dehydration, and
- Patient C is 4 years old and she has severe dehydration.

Which of them meets the case-definition for cholera? (there is an outbreak of cholera in the area).

Patient A Yes _____ No _____

Patient B Yes _____ No _____

Patient C Yes _____ No _____

Teaching points:

- *Patients A and B meet the case-definition for suspected cholera because they have acute watery diarrhoea in an area where there is a confirmed cholera epidemic.*

Even though they are not severely dehydrated, they do meet the case-definition.

- *Patient C does not meet the case-definition for cholera because she is younger than five years old. Even though she does not meet the case-definition, it is possible that she does have cholera. She should be treated according to cholera case management protocols. Nonetheless, because of her age, her case is not reported as cholera, but as “diarrhea.”*

4. **Identify person(s) to be notified of cases of suspected cholera**

- a. Ask participants to turn to the inside cover of the *Technical Guidelines*
- b. For each person whom they should notify about suspected cases of cholera, ask participants to write:
 - name
 - title
 - address (mailing and physical)
 - method(s) of contacting the person
- c. Discuss the best ways to send the notification. Participants from the same area, and their supervisors, may discuss the best methods together. The methods will vary, but might include:
 - a telephone number & alternate numbers in the same town
 - a FAX number
 - radio (discuss the location of a radio operator)
 - special courier (discuss who it might be)
 - the bus schedule so that an envelope can be given to the driver, and so on.

If they are to contact other persons (police, community leaders, customs officials, teachers, cross-border colleagues, etc.) list those persons also.

5. **Summary of Key Points**

Ask a participant to summarize the key points, or briefly summarize them yourself.

Session IV. Field Investigation - Analysis and Use of Results

OBJECTIVES: At the end of the lesson, participants will be able to:

- describe the field investigation for cholera
- calculate case fatality rates
- calculate the attack rate
- make a graph of the number of cholera cases and deaths

METHODS: Presentation, discussion, calculation exercises

MATERIALS: *Technical Guidelines on the Detection and Control of Epidemic Cholera*, overhead projector, prepared overhead projector transparencies for lectures, overhead transparency of graph for Exercise 4, graph paper, or blank paper and rulers, scratch paper, calculators (if available)

PREPARATION: ___ Assemble materials
___ Practice the lectures and put transparencies in order
___ Review calculations for the exercises
___ If participants will use the populations of their own districts for calculating the rates in Exercise 3, do the calculations before the lesson
___ Obtain current information on which laboratories have the capacity to identify cholera and fill in blanks in Learning Activity #6.

LEARNING ACTIVITIES: **2 hours**

1. **Introduction**

Explain the topic and the objectives. Explain that the information given this lesson is also found in Chapter 3 of the *Guidelines on the Detection and Control of Epidemic Cholera*

Point out that prompt and accurate analysis of the data about cholera is important because the results are needed to decide whether there is an epidemic, and, if so, how best to control it. In addition, the calculations done during the field investigation can also be done by district personnel during the course of an epidemic.

2. **Lecture - Field Investigation**

Give a lecture on conducting a field investigation, using the prepared overhead projector transparencies. Answer any questions. There are reduced versions of the transparencies on the following pages. There is room for you to write additional information you may want to mention.

3. **Discussion**

Lead a discussion about participants' experiences with the detection and confirmation of cholera. If they have no experience of epidemic cholera, ask them about outbreaks of other diseases, such as yellow fever or meningitis (the principles are the similar).

To begin the discussion, ask questions like these:

- how did you first find out about possible cases? (from patients coming to clinic, community health workers, teachers, students, newspaper, religious leaders, Ministry notification?)
- how exactly did you report the epidemic?
- what was the response?
- did you report suspected cases?
- how long did it take the laboratory results to arrive?
- did you visit the affected communities? did you report cases you found there? or heard about there?
- do you think there was a delay between the early cases, and the first notification?
- do you think there was a delay between the notification and the response?
- how can delays be avoided in the future?

4. **Lecture - Calculation of Rates**

Give a presentation on calculation of case fatality rates and of attack rates, using the prepared overhead projector transparencies. Answer any questions.

There are reduced versions of the lecture transparencies on the following pages. There is room for you to write additional information that you want to mention during the lecture.

5. **Exercise - Calculating Case Fatality Rates**

- a) Have participants turn to Exercise 2 in their Exercise Book, and ask them to do the Exercise on Calculation of Case Fatality Rates. They may refer to the *Technical Guidelines*. If calculators are available, they may use them. However, if participants use calculators, be sure that they understand how to “set up” the calculations.
- b) As participants work, circulate and make sure that they understand what to do. Give advice to anyone who needs it. When they have finished, ask for their answers, and discuss any problems.
- c) The correct answers are below, in italics.

Exercise 2 - Calculation of Case Fatality Rates

An epidemic of suspected cholera has just begun in three districts of Lin Province. There are five districts in the Province and the total population of the Province is 500,000.

- *Capital District* reported 1600 cases, and 40 deaths. The provincial hospital is located in the main town, which is the largest in the province. The total population of the district is 150,000 inhabitants.
- *Remote District*, where the outbreak was first noted, reported 200 cases and 25 deaths. It is a remote and sparsely populated area, with few health services. Transport and communications are difficult. The total population of Remote District is 50,000 persons.
- *Market District* reported 200 cases and 10 deaths. There is a medium sized town with a large market and a small hospital. The district population 100,000.

1. What is the case fatality rate in the Province as a whole?

Provincial Case fatality rate = total deaths in province / all cases X 100.

Total deaths = 40 (Capital Dist) + 25 (Remote Dist) + 10 (Market Dist) = 75

Total cases = 1600 (Capital Dist) + 200 (Remote Dist) + 200 (Market Dist) = 2000

75/2000 = .0375 X 100 = 3.75 The case fatality rate for the province as a whole is 3.75%

2. What is the case fatality rate in Capital District?

$$40 / 1600 = 0.25 \times 100 = 2.5$$

The case fatality rate in the district is 2.5%

3. What is the case fatality rate in Remote District?

$$25 / 200 = 0.125 \times 100 = 12.5$$

The case fatality rate is 12.5%

4. What is the case fatality rate in Market District?

$$10 / 200 = 0.05 \times 100 = 5$$

The case fatality rate is 5%

5. What are possible reasons for the differences in case fatality rate in Remote District and Capital District? (write key words)

Remote District:

The high case fatality rate in Remote District may be due to:

- (a) the outbreak began there, and the first response may have been slow*
- (b) it may have been difficult to get supplies to Remote District.*
- (c) there may have been too few accessible health workers, or the health workers may not have been trained, or had supplies they needed,*
- (d) it might have been hard to reach isolated communities with health education..*

Capital District:

The case fatality rate is lower here, perhaps because:

- (a) the district made preparation for possible cholera, when they learnt of the outbreak in Remote district,*
- (b) the hospital was ready to care for severely ill patients,*
- (c) supplies were available,*
- (d) more trained health workers were available*
- (e) where transport is easier, ill persons can reach health facilities in time*
- (e) it is easier to reach a compact population with health education.*

4. Exercise - Calculating Attack Rates

- a) Ask participants to turn to Exercise 3 in their Exercise Book and do the Exercise on Calculation of Age-Specific Attack Rates. They may refer to the *Guidelines*. If calculators are available, they may use them. However, be sure that they understand how to “set up” the calculations.

b) As participants work, circulate and make sure that they understand what to do. Give advice to anyone who needs it. When they have finished, ask for their answers, and discuss any problems.

c) The correct answers are below, in italics.

Exercise 3 - Calculate Attack Rates

Refer to the description of Lin Province in Exercise 2.

1) What is the attack rate for cholera for Lin Province?

Attack rate = number of cases / population at risk X 100.

Total cases 2000

Total Provincial population = 500,000 persons

$$2000 / 500,000 = .004 \times 100 = 0.4$$

The attack rate for the province as a whole is 0.4%

2. What is the attack rate in Capital District?

$$1,600 / 150,000 = 0.0106 \times 100 = 1.06 \text{ (round to 1.1)}$$

The attack rate in Capital District is 1.1%

3. What is the attack rate in Remote District?

$$200 / 50,000 = 0.004 \times 100 = 0.4$$

The attack rate is 0.4%

4. What is the attack rate in Market District?

$$200 / 100,000 = 0.002 \times 100 = 0.2$$

The attack rate is 0.2%

5. Where is the attack rate is the highest? *Capital District*

Where is the case fatality rate the lowest? *Capital District*

What is a possible reason for this?

Cholera may have spread quickly in the capital city. Although many of the people who live there are becoming ill, the health services were able to take care of them.

Teaching Points/ Additional Discussion:

- *Discuss difference between rates and numbers of cases/deaths*
- *Ask participants, "Given this information about the outbreak of suspected cholera, what would you do next?" "Which District may need help?"*
- *Ask participants: "The epidemic in Lin Province is just beginning. Do you think that the attack rates and case fatality rates will stay the same throughout the epidemic?" "What factors could account for changes?"*
- *Discuss problems in reporting. Ask participants:*
 - *"Do you think that all cases and deaths are being reported?"*
 - *"Do you think that cases or deaths are more likely to be reported?"*
 - *"Which District would you guess has the most complete reporting? which District would you guess has the least complete reporting?"*

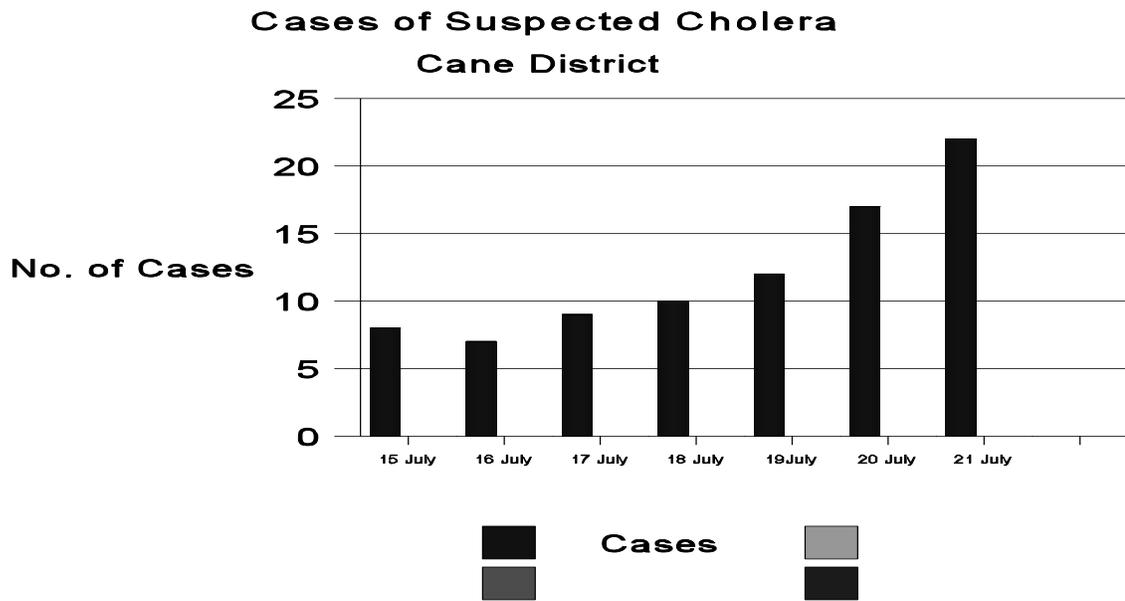
5. Exercise - Making a Graph

- a) Have participants open their Exercise Books to Exercise 4.
- b) Explain that they will use the data given in the Exercise to make a graph showing the number of suspected cholera cases and deaths that occurred in one week in Cane District.
- c) As participants work, circulate and make sure that they understand what to do. Give advice to anyone who needs it.
- d) When they have finished, look at their graphs, and show the transparency of the correct graph. Discuss any problems.

Exercise 4 - Make a Graph

There is a cholera outbreak in Cane District. The Epidemic Committee has asked you to make a graph that shows the number of suspected cholera cases that occurred from May 15th to May 21st. These are the number of cases that were reported that week.

Number of Cases	8	7	9	10	12	17	22
Date	May 15	May 16	May 17	May 18	May 19	May 20	May 21



6. Tell participants the name of the best laboratory to use for their area. Give them the address and phone of the laboratory and the title (and/or name) of the person to contact. Ask participants to write the information on the inside front cover of their *Guidelines*.

Name of Contact _____

Title of Contact _____

Name of Laboratory _____

Address of Laboratory _____

Telephone of Laboratory _____

Other rapid means of contacting laboratory _____

7. **Summary of Key Points**

Ask a participant to summarize the key points, or briefly summarize them yourself.

Session V. Responding to a Suspected or Confirmed Cholera Epidemic

OBJECTIVES: At the end of this lesson, participants will be able describe how to respond to a suspected or confirmed epidemic of cholera

METHODS: Lecture, discussion. small group exercise

MATERIALS: Prepared overhead projector transparencies, flipchart and pens

PREPARATION: ___ Practice lectures and put transparencies in order
___ Review the information on clinical presentation and management of cholera in Chapter 2, Section 4.5 and Annex 1 of the *Guidelines*.
___ Review the national and local experience in cholera control, and make notes to prepare for the discussion in Learning Activity 5.

LEARNING ACTIVITIES

2.5 hours:

1. **Introduction**

Explain the topic and the objectives. Explain that the information given this lesson is also found in Chapter 4 of the *Guidelines on the Detection and Control of Epidemic Cholera*

2. **Lecture: How to Respond to a Suspected or Confirmed Epidemic of Cholera**

Give a presentation on responding to an epidemic, using the prepared overhead projector transparencies. There are reduced versions of the transparencies on the following pages. There is space for you to write additional things you want to mention during the lecture.

Answer any questions.

3. **Lecture: Clinical Management of Cholera**

Give a lecture on the clinical presentation and management of cholera, using the prepared overhead projector transparencies. There are reduced versions of the transparencies on the following pages.

Answer any questions.

4. **Written Exercise - Clinical Management of Cholera**

- a) Ask participants to turn to Exercise 5 in the *Exercise Book* and to open their *Guidelines* to Annex 1. They should use the information in the Guidelines as they do this exercise.

Ask them to write answers to the questions in Exercise 5. As they work, circulate and help anyone who appears to be having trouble.

- b) When they have finished, review the correct answers (they are below in *italics*).

Exercise 5 - Case Management

On July 10, an 8-year-old boy is brought to a health center by his father. The boy has profuse, watery diarrhea and vomiting which began 24 hours earlier. He also has painful leg cramps. The boy is extremely weak and appears sleepy. Although he says he is thirsty, he appears too weak to lift his head to drink. His eyes appear very sunken, and his skin pinch goes back very slowly.

- 1) What signs of dehydration does the boy have? Write them below and circle any that are "key" signs.

- *lethargy (sleepy) KEY SIGN*
- *drinks poorly or not able to drink KEY SIGN*
- *skin goes back very slowly after being pinched KEY SIGN*
- *very sunken eyes*

- 2) Does the boy show signs of no (Plan A), some (Plan B), or severe (Plan C) dehydration?

The boy shows signs of severe dehydration (Plan C). He has 4 signs of dehydration, including 3 key signs in column C (lethargy, drinks poorly or not able to drink, skin goes back very slowly).

- 3) The boy is older than 5 years of age. What other signs of dehydration should you look for?

- *weak or absent radial pulse*
- *low blood pressure*

- 4) Outline your treatment plan for the first 3 hours (he weighs 25 kg).

- *For the first 30 minutes, give intravenous fluids at 30 ml/kg. The boy weighs 25 kilograms so he should receive 750 ml in the first 30 minutes. Ringer's Lactate is the preferred intravenous fluid.*
- *If after 30 minutes the boy's pulse is not strong, repeat the treatment above: 750 ml in 30 minutes.*
- *Next, give intravenous fluids at 70 ml/kg for 2½ hours. The boy should receive 1,750 ml. in 2½ hours.*
- *Begin oral rehydration as soon as the boy can drink. Give ORS as soon as possible during and after intravenous therapy.*
 - *Reassess his hydration status after the first 30 ml/kg of IV fluid is given, and then every 1-2 hours.*

After 3 hours of treatment, the boy's hydration status is completely reassessed. Compared with the initial examination, his eyes are less sunken and his skin goes back more quickly after being pinched. The boy is alert and irritable. He requests ORS constantly to quench his thirst. He continues to have profuse, watery diarrhea, but the vomiting and leg cramps have stopped. The boy appears to have some dehydration (Plan B).

5) Outline your treatment plan for the next 4 hours

- *He can now be rehydrated using only oral rehydration. Offer ORS solution at a rate of 75 ml/kg = 1,875 ml of ORS over the next 4 hours.*
- *Offer food.*
- *Re-assess every 1-2 hours, and completely re-assess after 4 hours.*

After 4 hours of ORS therapy alone, the boy's hydration status is reassessed. He shows no signs of dehydration (Plan A). He still has frequent diarrhea.

6) Outline your treatment plan at this point.

- *Keep the boy at the health center under observation until his diarrhea stops.*
- *Continue to give the boy ORS to prevent dehydration from recurring. Give him 200 ml of ORS after each episode of diarrhea.*

- *Reassess his hydration status every 4 hours.*

7) Should this patient be given an antibiotic? If so, which one and what dose?

Yes, antibiotics should be given to patients who are severely dehydrated (Plan C).

Trimethoprim-sulfamethoxazole (TMP-SMX) is the antibiotic of choice for children with severe cholera. However, it is important to find out if cholera strains in the area are resistant to any of the recommended antibiotics.

Give Trimethoprim / Sulfamethoxazole, (TMP 125 mg and SMX 625) mg twice a day for three days. He is eight years old and weighs 25 kg.

5. **Discussion - Response to Cholera Epidemics**

Lead a discussion about participants' experiences in responding to an epidemic of cholera. If they have not been involved in responding to an epidemic of cholera, ask them to think of other epidemics they may have been involved with.

Devote about five minutes to each of these topics (some will take less time, and others longer). If none of the participants has had first-hand experience with cholera, then shorten this whole discussion.

Beside each topic is a reference to where it is covered in the *Guidelines on the Detection and Control of Cholera*. Refer to the Guidelines if there is confusion - do not take time to read about each topic, but let participants know where they can find the information later.

Discussion topics

- Epidemic Committee (Section 4.2)
- Reporting Cases (Section 3.3 and 4.3)
- Treatment of Patients (Sections 4.5 and Annex 1)
- Water and Sanitation (Section 4.6)
- Health Education (Section 4.6 and Annex 2)

Use a sheet of flipchart paper for each topic, and ask one participant to record key words from the answers on the flipchart.

Ask these questions to start the discussion:

- What were the successes?
- What were the problems?

- What lessons did you learn?
- Have you already acted on what you learnt?
- What kind of obstacles prevented an effective response?

During the discussion, make or reinforce points by referring to previous epidemics in the country. Praise the participants for past successes and their efforts. Remind them that the key to preventing early deaths in an epidemic is being prepared - being ready to respond before the epidemic.

6. Summary of Key Points

Ask a participant to summarize the key points, or briefly summarize them yourself.

Session VI. Health Education

OBJECTIVES: At the end of this lesson, participants will be able to:

- state cholera health education messages
- discuss adapting messages to local circumstances

METHODS: Lecture, discussion

MATERIALS: Public education materials on cholera, if available

PREPARATION: ___ Get examples of local or national public education materials on cholera.
___ As part of the workshop invitation, ask participants to bring any examples of cholera health education materials with them
___ Practice the lecture.

LEARNING ACTIVITIES

60 minutes

1. **Introduction**

Explain the topic and the objectives. Point out that information on health education is in Section 4.4 of the Guidelines, and that there are sample messages in Annex 2.

2. **Lecture: Health Education Messages**

Give a lecture which reviews the WHO suggested health education messages, using the prepared overhead transparencies. There are reduced versions on the following pages.

3 **Discussion - Health Education Messages**

- a) Ask participants to turn to the health education messages in Annex 2 of the Guidelines. Ask them to open their Exercise Books to Exercise 6 and to use the blank space there to make notes on the discussion of the health education messages.
- b) Consider the messages one by one by asking a participant to read one, and then discussing the message with the group. After you have answered any questions, ask another participant to read the next message and discuss it. Continue in the same way for all the messages.

For each message, ask the participants:

- Is the message is clear to you?
- Do you think it would be clear to the community members where you work? If not, how could it be re-phrased?
- Are there any recommendations that it would be difficult to do by community members? If so, what do you suggest?
- In your area, what would be the best ways to get these messages to the public?

4. **Local Health Education Messages**

(Do not do this Learning Activity if there are no local examples available)

- a) Display local Health Education posters or handouts.
If any participants brought health education materials, thank them and ask them to show them, and to explain how and where they were used (if there are many, chose several to discuss).
- b) Lead a discussion similar to the one above about the local messages. In addition to the questions listed in Learning Activity 3, ask participants to evaluate whether the messages:
 - are accurate and up to date (consistent with Guidelines or national policy)
 - the most important messages for the public.

Ask participants to suggest improvements, if they think they are needed.

5. **Summary of Key Points**

Ask a participant to summarize the key points, or briefly summarize them yourself.

Session VII. Being Prepared for an Epidemic

- OBJECTIVES:** At the end of the lesson, participants will be able to:
- name components of epidemic preparedness
 - explain simple measures that may be used to evaluate epidemic preparedness
- METHODS:** Presentation, discussion, written exercises
- MATERIALS:** Forms used at health center level, prepared overheads, flip chart paper and pens, scratch paper, calculators, if available
- PREPARATION:**
- ___ Practice lectures and put transparencies in order
 - ___ Find out if there are national or local guidelines which assign specific responsibilities for cholera detection and control to district and health facility level health workers. If there are, compare them to those suggested in Annex 6 of the *Guidelines*. If they differ significantly, prepare a handout of those that apply to the participants and to health workers whom they supervise.
 - ___ If all participants are from one area, calculate the amount of treatment supplies that would be needed for that area

LEARNING ACTIVITIES

3 hours

1. **Introduction**
Explain the topic and the objectives. Explain that the information given this lesson is also found in Chapter 5 of the Guidelines on the Detection and Control of Cholera.
2. **Lecture - Preparedness**
Give a presentation on being prepared for an epidemic of cholera. There are reduced versions of the prepared overhead transparencies on the following pages.

3. **Public Health Responsibilities**

- a) Ask participants to turn to Annex 6 of the Guidelines OR to look at the Responsibilities handout you prepared..
- b) Describe the responsibilities of the different levels of the health care system in detecting and controlling cholera epidemics.
 - spend more time on the level at which participants work, and on the level which they supervise.
 - briefly mention what they can expect from higher levels.

4. **Lecture - Estimating Treatment Supply Needs**

Give a lecture on estimating treatment supply needs, using the prepared overhead projector transparencies. There are reduced versions on the following pages.

5. **Exercise - Estimating Treatment Supply Needs**

- a. Ask participants to open their Exercise Books to Exercise 7 and to open their Guidelines to the part of Section 4.5 in Chapter entitled "*How to Estimate the Amount of Supplies Needed for a Cholera Outbreak*". Tell them that they will estimate the amount of treatment supplies that would be needed for their own district, in the event of a cholera epidemic. Ask them to read the exercise and begin the calculations. Participants from the same area may work together.

If time is short, do not have participants calculate all the supply items on the list. Ask them to begin, and stop the exercise when you have checked that each participant understands how to do the calculations.

- b. Ask participants work, circulate and make sure they understand the exercise.

Exercise 7 - Estimate Treatment Supply Needs	
Cholera Treatment Supplies	
	Amount
Rehydration Supplies	
ORS packets - 1 litre each	
Bags of Ringer's lactate solution, 1 litre each	
Adult IV giving sets	
Scalp vein sets	
Nasogastric tubes for adults	
Nasogastric tubes for children	
Other Treatment Supplies	
Large water dispensers	
One litre bottles for ORS solution	
Half litre bottles for ORS solution	
Tumblers	
Teaspoons	

Exercise 7 - Estimate Treatment Supply Needs	
Cholera Treatment Supplies	
	Amount
Cotton wool, kg	
Rolls of adhesive tape	
Antibiotics for Cholera	
Doxycycline capsules, 100 mg each OR	
Tetracycline capsules, 250 mg each	
Trimethoprim-sulfamethoxazole tablets (for children)	

6. Group Exercise - Refine Emergency Response Plan

- a) Ask participants to open the *Guidelines* to Section 5.9 and the *Exercise Books* to the Self Study Project No. 9
- b) Explain that they will do part of this Project today, in order to clarify how to write an Emergency Response Plan and in order to identify any elements of planning that should be clarified or added. They will make the Plan for their area, after the workshop, as one of the Self Study Projects..
- c) Ask participants to work in groups of two or three. Assign each group of participants three of the activities from those listed in the planning matrix in the Exercise Book (Group 1 might work on Activities, 1, 2 and 3.; Group 2 might work on Activities 4, 5 and 6 and so on - there will be some duplication). Give each group flip chart paper, and ask them to fill in the planning matrix for their own area.
- d) As they work, circulate and check to be sure they understand the assignment.
- e) When they have finished, lead a discussion about their answers. The purpose of the discussion is to review possible approaches to the emergency response plan and for participants to share creative ideas.
 - For each activity, write the name of activity and matrix headings at the top of a fresh sheet of flip chart paper (see example for Activity No. 11, below).

- Ask *one* of the groups that worked on that activity to report what they listed. Note key words on the flip chart paper. Then ask other groups who worked on that same activity if they have anything *additional* to add (they should not repeat what the first group reported).
- For each activity, discuss different approaches that the different groups used.

Activity No. 11 "Inventory Treatment Supplies"				
Person responsible/ alternate	time frame	materials/ resources needed	source	cost
1) Chief Medical Officer (asks all health facilities to submit inventories) Senior officer at each health facility is responsible for submitting inventory 2) Stores Manager	1) as soon as 1st suspected case is reported 2) every week, during the outbreak	1) list of treatment supplies 3) stationary / stock cards 4) method of communication with health facilities (a) courier (b) telephone	Lists = Cholera Guidelines Stationary = in stock Communication = courier is nursing assistant	1) transport fees for courier 2) for stationary

6. Summary of Key Points

Ask a participant to summarize the key points, or briefly summarize them yourself.

Session VIII. Workshop Follow-Up and Self Study Projects

- OBJECTIVE:** At the end of the lesson, participants will:
- know about follow up activities and how to do the self-study projects
 - have taken and reviewed the post-test
- METHODS:** Presentation, discussion, written test
- MATERIALS:** Technical Guidelines on the Detection and Control of Cholera, Exercise Book, schedule for follow-up activities, post-test
- PREPARATION:**
- ___ Decide on follow-up activities (i.e., future meetings of participants to discuss/work on Self Study Projects, or scheduled visits to participants as follow up)
 - ___ Prepare schedule for completion of Self Study Projects and follow-up activities (e.g., within 3-6 months if only working on the cholera preparedness, or within 12 months if participants are working on yellow fever and / or meningitis preparedness as well).
 - ___ Review Self-Study Projects
 - ___ Make one copy of the post-test (identical to pre-test) for each participant

LEARNING ACTIVITIES

2-3 hours

1. **Introduction**
Explain the objectives of this session.
2. **Post-Test**
 - a) Administer the Post-Test. Participants may refer to their *Guidelines* as they take the test - but they should not consult each other.
 - b) Grade the test while participants are reading the Self Study Exercises (see next Learning Activity).
 - c) After finishing the next Learning Activity, give correct answers to the test, and answer any questions.
3. **Plan for Follow Up and Self-Study Projects**
 - a) Ask participants to open their Exercise Books to the Table of Contents. Point out the list of self Study Projects. .

b) Tell participants that:

- These Projects are an important continuation of this workshop. As you do them you will practice the skills needed to prepare for and respond to an epidemic of cholera, and your district will become better prepared
 - They are called “Self Study” Projects because you will do them without a facilitator’s guidance, back at your place of work. However, you do not have to work on them alone - if possible work with another participant from this workshop, and with other colleagues. Working with others at your place of work is a good way to share what you learned in this workshop.
 - The information you will need is in the *Guidelines on the Detection and Control of Epidemic Cholera* .
 - There is one Project, and there may be several follow-up Projects for each of the Preparedness Components that were discussed in Chapter 5 of the Guidelines.
 - There is a logical sequence of preparation and response activities, and the Projects are in that order. However, this sequence is merely recommended, not required. Since different districts will be at different stages of readiness, you can do the exercises in the order that you feel will benefit your area the most.
 - Try to finish all the Projects in the suggested time frame (pass out and explain the schedule).
 - After you return to your place of work, carefully read about each of the Projects. Decide whom you will work on them with, and decide on the order in which you will do the Projects. Adapt the suggested schedule.
 - These are the arrangements for future meetings and follow-up:
-
-

c) Allow participants some time to look at the descriptions of the Self Study Projects. As they do this, grade the Post-Test. Answer any questions they have about the Self Study Projects.

4. **Review Post-Test**

Ask participants about their answers to each question. Give the correct answers and answer any questions.

5. **Summary**

Ask several participants to:

- briefly name something new that they learnt in this workshop
 - say what they thought was the most important thing they learned
 - explain how they will use what they learned when they return to their place of work.
-

Pre/Post Test

Write brief answers to each question - do not write complete sentences.

For multiple choice questions, circle the letter that corresponds to the one best answer.

1. Write the case-definition for “suspected cholera”.

2. Name two effective control measures which can stop the spread of a cholera epidemic.
 - a)
 - b)

3. Name two ineffective control measures, which are not for cholera.

3. Age-specific attack rates
 - a) What is the weekly Age Specific Attack Rate for 5-14 year olds in Emerald District?
 - the total population of the District is 50,000
 - 5-14 year-olds make up 28% of the total population
 - there were 20 cases of cholera in children 5-14 years old in one week.
 - a. 71%
 - b. 142 cases per 100,000 persons
 - c. 142 cases per 50,000 persons
 - d. 28 cases per 100,000 persons
 - e. 71 cases per 100,000 persons
 - b) What are age-specific attack rates used for, in the control of cholera?

-  4. List three activities that should be done to make a district ready to detect and control an epidemic of cholera.
 - a.
 - b.

- c.
5. What is “zero reporting” and why is it useful?
6. You suspect that a cholera epidemic has begun in your district.
- a. Whom will you notify? Give title and name.
- Title: _____
- Name: _____
- b. How will you notify that person? Give the method of communication and how long you think it will take for them to receive your notification.
- Method of communication _____
- Time: _____
7. There is a epidemic of cholera in your district. How will you decide who should be vaccinated?
8. To respond to an epidemic of cholera , you have calculated that 50,000 people in your district need to be vaccinated. How many doses of vaccine should you request?
- a. 86,500
- b. 71,125
- c. 50,000
- d. 58,500
- e. 100,000
9. Why are mosquito nets during an epidemic of cholera? If there is a shortage of nets, who should use them?
10. For this question, write a “T” if the statement is true and an “F” if it is false.

Examples: $\frac{F}{T} \quad 2 + 2 = 7$
 $\frac{T}{T} \quad 2 + 2 = 4$

- a. ___ During an epidemic of sylvatic cholera, only men who work in the forest need be vaccinated
- b. ___ Cholera virus can be isolated from the blood of patients with cholera during the first 3-6 days of illness.
- c. ___ Cholera vaccination may be recorded on a woman's TT card.
- d. ___ There is no danger of a cholera epidemic in countries which regularly include cholera vaccine in the EPI program.
- e. ___ *Aedes aegypti* is the most common vector of sylvatic cholera.
- f. ___ Strict isolation should be observed for patients with suspected cholera, to prevent further spread of the disease.
- g. ___ Paracetamol (acetaminophen) should be used to reduce fever in patients with suspected cholera.
- h. ___ If possible, aerial spraying of DDT should precede any mosquito elimination efforts at the household level.
- I. ___ There is no danger of cholera in desert areas, because mosquito larvae need standing water to breed.
- j. ___ Relative bradycardia and conjunctival congestion are signs that suggest cholera.

Answers to Pre/Post Test

1. *Sudden onset of fever, followed by jaundice, and one or more of: bleeding in the mouth, black vomitus, death.*
2. *a) Vaccination
b) Reduction of mosquito vector*
3. *b. 143 cases per 100,000 persons*

Age-specific attack rates are used to determine the age groups at high risk - these are the groups that should be vaccinated.

4. *Any three of the components listed in Section 5.1 of the Guidelines*
5. *Zero reporting is when a health facility sends a report of “zero” cases. It allows higher levels to distinguish between health facilities that had no cases and those that did not report.*
6. *Correct answers will include the name or title of the person, and a rapid and reliable method of communication.*
7. *By identifying the area where the epidemic is occurring, and by identifying age-groups at high risk, or by vaccinating persons 1-15, or 1-30 years of age.*
8. *b. 71,125*
9. *Mosquito nets prevent mosquitoes biting viremic patients, and then transmitting the disease to a well person. Febrile persons should use them.*
10. *a. F
b. T
c. T
d. F
e. F
f. F
g. T
h. F
i. F
j. T*